JDSF Newsletter
Jackson Demonstration State Forest
State of California Dept. of Forestry P.O. Box 1185 Fort Bragg, CA. 95437

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JDSF'S CAMP 20 VISITOR CENTER: A NEW FORESTRY EDUCATION STOP ON HIGHWAY 20

Norm Henry

As part of our mandate to demonstrate forest management activities, plans were developed eighteen months ago to construct a visitor center at Camp 20. This area has historically been a rest stop for travelers using State Highway 20. Each year, thousands of tourists and most local residents use this road to travel between Fort Bragg and Willits. As Camp 20 is centrally located between these two towns and offers an excellent stopping point for travelers, we decided to further develop this area.

The early stagecoach road going by Camp 20 originated on the coast at Mendocino and ended at the Ukiah Valley. To transport logs to their mill, the Caspar Lumber Company later developed a railroad system from the mouth of Caspar Creek, over the coastal flats and up Hare Creek. A tunnel was constructed through to the South Fork of the Noyo River and the rail line eventually was extended to Camp 20, about 15 miles from the ocean. The present day Highway 20 near Camp 20 follows along part of the stage route and the railroad grade.

Camp 20 was the last logging camp built by Caspar Lumber Company, opening in 1939. Several dozen small houses were built here for the logging crews. In addition, a cookhouse was built based on a design Kelly McGuire, logging superintendent for the Caspar Lumber Company, observed in the Sierra. A store, schoolhouse and "donkey shop" were moved from Camp 19 to this site during this time as well. The latter structure was originally constructed at Camp One and used for steam donkey repairs. At Camp 20, it's eventual use was for log truck and Caterpillar repair. Tractor yarding began in 1928 and the building's name was changed to the "cat barn".

When the State of California purchased the Company's lands in 1947, everything left on the site became state property. Today, the only logging camp structures remaining are the "cat barn" and the schoolhouse. Another relic from the Camp is a steam donkey owned by the Caspar Lumber Company. It was located on the north side of the highway, across from the existing picnic grounds and ball field. The donkey was left

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where the railroad grade came out of the Chamberlain Creek drainage. It is a large double drum machine made by the Willamette Iron and Steelworks of Portland in about 1910. Wood fires below boiler tubes in the donkey generated enough steam pressure to winch in old-growth redwood logs. This was accomplished by turning drums spooled with large diameter cable. The donkey was moved around on 55-foot Douglas-fir log skids.

For many years, Camp 20 has been used by coastal residents as a sunny place to spend the day out of the fog. Several picnic tables and barbecue grills, a ball field, and two horseshoe pits have been in place since the late 1960's. As part of the initial redevelopment of the Camp 20 site, these facilities have been refurbished. In addition, the steam donkey was moved across the highway and situated close to the planned location of the visitor center. Its visibility is greatly enhanced at its new location (see Fig. 1). The donkey was cleaned and primed with marine paint and finally given a finish coat of black underbody automotive paint. Future plans include mounting it on new old-growth Douglas-fir log skids (which will be obtained from a timber sale in the North Fork of Caspar Creek), correctly mounting the water tank, and fixing the plumbing hardware. The steam donkey will probably always be a static display, as considerable effort and money would be needed to renovate it to the point where it could be fired up. The Mendocino County Museum at Willits does have a similar steam donkey in operating condition and demonstrates it during the July 4th holiday.

The next stage of development at Camp 20 was to construct a redwood beamed open air information center. The original design was borrowed from a vintage 1930's National Park Service structure.

Figure 1. The Camp 20 Visitor Center.

Our building, however, was constructed with large sawn timbers, while the plans specified unsawn logs. The intent was to build a structure which would accentuate the big timbers and still provide an open, well lit display area. The central rectangular column was planned as part of the display system. Each side has a case which contains either graphic and text materials, or other physical objects specific to Jackson Demonstration State Forest. Fire Crew Supervisor Carlos Farre constructed the structure and the woodworking shop at Chamberlain Creek Conservation Camp built the display cases. The displays are intended to be temporary and will be rotated about twice a year. Currently, a second set of displays have been created and installed in the cases. Subjects range from silvicultural techniques to recreational opportunities on the Forest.

To complement the information center, several additional display panels will be situated around this structure. Through a contract with Chico State University, nine large panels are being developed which will further educate our visitors about forestry in the redwood region. Specifically, the subjects being addressed are: 1) The California Department of Forestry and Fire Protection, 2) The California Demonstration State Forest System, 3) timber management on JDSF, 4) demonstrational and experimental programs on JDSF, 5) recreational opportunities on JDSF, 6) wildlife on the Forest, 7) flora of JDSF and the North Coast, 8) the coast redwood - ecology and physiology, and 9) the steam donkey - early logging practices on JDSF and the North Coast.

The next development at the Camp 20 site was a concrete block rest room. The design is based on plans developed by the US Forest Service. The engineering staff on the Stanislaus National Forest sent us their drawings and material specifications for this structure. The building was constructed by inmates from the Chamberlain Creek Conservation Camp under the supervision of Fire Crew Supervisor Bob Sallee.

Future development at Camp 20 may include renovating the "cat barn" and using it to house large historical artifacts. The structure is currently being evaluated by historical architects to assess the feasibility of its restoration. Major construction would be needed to complete this work. Additionally, we would like to develop the "little red schoolhouse," which is currently located a short distance to the east of the main Camp 20 area. This schoolhouse was moved from one logging camp to the next in three sections on log skids. It was used at Camp 19 until 1939, and then transported to Camp 20, where it was in use until 1955. A large pot bellied stove, desks, and books remain inside today. Given sufficient funding, this historic building could be developed as a local State Forest museum.

Finally, we plan to renovate the old Chamberlain Creek Demonstration Trail and turn it into a first class educational facility. Built in the early 1970's, the trail starts out directly across from Camp 20 and climbs over the railroad grade into an old-growth redwood forest. It illustrates much about redwood ecology on a poorer growing site. With proper signs to advertise the trail, a new illustrative brochure, and minor construction work, it will add to the total experience of stopping at Camp 20.

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WET WEATHER LOG HAULING IMPACTS ON WATER QUALITY

Peter Cafferata

Skyline cable logging operations have become very important on the North Coast in the last 20 years. As harvesting has shifted away from a dependence on ground based skidding, so has the requirement of a rigid seven-month logging season. Skyline cable logging is usually permitted year round, and hauling from landings is allowed if the roads are rocked. The California Forest Practice Rules specify only that the road surface must be stable throughout its period of use and that equipment must be able to operate under its own power. In addition, operations can not take place when mud coming off the roads can reach watercourses.

In recent years, it has become apparent that hauling logs on some roads under very wet conditions may not be appropriate. If the surface is soft due to subsurface moisture entering the road prism during the summer period and a source of high quality road rock is not readily available, winter hauling will likely cause surface deterioration and sediment transport. The highly fractured sandstone and shale from rock pits here in Mendocino County often break down easily. In addition, heavy traffic from logging trucks causes the rock to be pushed into the road bed, and this forces or "pumps" fine grained sediment upward. Sediment is then washed down ruts in the roads to inside ditches draining into ephemeral draws. During storm events, this material is rapidly routed down to larger fish-bearing streams. The closer the road is to large watercourses, the more likely it is to be a problem.

Researchers in the Pacific Northwest have previously documented this problem. Wooldridge (1979) monitored sediment levels in streams above and below inflow from road culverts in Washington forests. In the winter period, he found higher sediment concentrations below the culverts. In a definitive study in the Olympic Mountains, Reid and Dunne (1984) found that sediment yields from road surfaces are extremely sensitive to traffic levels during storm events. For example, if more than four trucks hauled per day, their roads contributed sediment at 7.5 times the rate of the same roads on days they were not being used.

Here on JDSF, winter hauling has been occurring regularly for the last eight years. For the most part, water quality problems from this activity have not been severe. Roads for cable operations are generally near ridges and a sufficient quantity of rock has been applied to keep surface deterioration to a minimum. During this past winter, however, we noted serious road runoff problems in the Hare Creek 1988 Timber Sale.

The main haul route was on Road 450, an existing midslope road with wet spots in several locations. The rock which was applied failed to adequately surface the road. Rocking was done very late in the season (through November), after the road bed had been softened by rainfall, and adequate shaping of the road could not be achieved. Geotextile fabric was applied in a few locations, but generally was not covered with a sufficient quantity of rock. In many locations the road bed remained soft and rutted. Compounding the problem was surface drainage from Road 510, a poorly drained ridge road above Road 450. Indiscriminate use of four-wheel drive vehicles on Road 510 destroyed waterbars and made large mud holes which drained into the sale area. In one location, water drained down Road 510 for over 1000 feet unimpeded. In February 1989, surveys of small streams draining the sale area showed large quantities of recently deposited fine grained sediment stored in the channels.

To correct this situation, we did several things. First, hauling

was restricted during significant rainfall events (i.e., greater than 0.25 inch), and up to 24 hours after such storms. Straw bale check dams were constructed to stop sediment coming from Road 510, and waterbars were reconstructed by hand on that road. Finally a small scale water sampling study was started to document the problem.

Sampling stations were set up at seven locations where small ephemeral streams crossed Road 450 through culverts. Six of these sites were at key locations in the sale area, while one was along an undisturbed section of Road 450. Watershed sizes ranged from three to twenty acres and all drain into the South Fork of Hare Creek. Storm events during March were sampled five times, both above the influence of the road and below the road (see Fig 1). Sixty-three "grab" samples were collected in plastic bottles and acidified. Turbidity values were determined for all samples with a Hach 2100 A turbidometer in the laboratory. Fifteen of these samples and another nine from the Hare Creek drainage were analyzed for suspended sediment concentration using a standard filtering apparatus, or through evaporation in a ceramic crucible.

Results of the laboratory work showed a very strong relationship between turbidity (NTU) and suspended sediment concentration (SSC). Turbidity is defined as the degree to which light penetration is impeded by suspended material and depends on the shape, arrangement, and reflectivity of the solids in suspension. Past research has shown a correlation between the two variables, but the relationship differs from watershed to watershed (Beschta 1980). The equation generated for Hare Creek is $SSC = 1.67\ NTU^{0.97}$ with an r^2 of 0.99.

For five of the six stations sampled in the sale area, average turbidity was much higher below the road than above the road. The one station (No.4) which had similar turbidity levels above and below was from a three-acre watershed with almost no surface flow. Overall, the sale area stations had an average turbidity of 115 NTU (or estimated 167 mg/l SSC) above the road, and an average of 678 NTU (or estimated 931 mg/l SSC) below the road. The variability of the turbidity values was very great due to the amount of rainfall immediately preceding sample collection, amount of hauling prior to sample collection, and individual station characteristics. Due to this extreme range in values, paired T-tests did not show a significant difference at the alpha equals 0.05 level. The control station had above and below readings of 30 and 31 NTU, respectively. Station 3, which was heavily impacted by runoff from Road 510, showed very high sediment levels both above and below the road prior to the reconstruction of the waterbars. Sediment levels above the road here were much lower after that work was completed.

To test the impacts being produced by hauling, one of the five sampling periods in March occurred during a day when active trucking was permitted and it was raining heavily at times (see Fig. 2). The highest turbidities measured at two of the stations

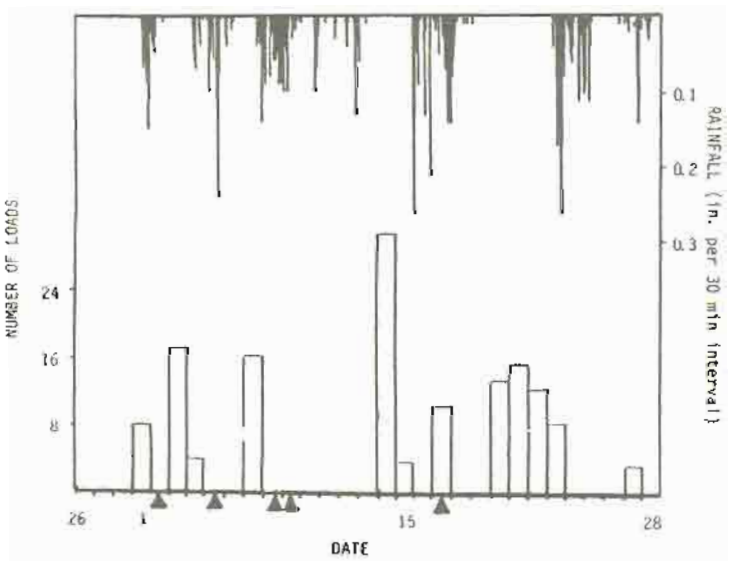

Fig. 1. Hauling and rainfall for Mar. 1-28, 1989. Arrow indicates sampling period.

were obtained this day. It was conclusive evidence to everyone that trucking during the storm on this road was causing significant environmental damage.

When Station 3 is excluded from the data set (because of the Road 510 influence), the following average turbidity values were measured below the road:

1) hauling with rain- 2504 NTU (n=4)
2) no hauling with rain- 317 NTU (n=14)
3) no hauling with no rain- 98 NTU (n=4) (n equals the number of samples).

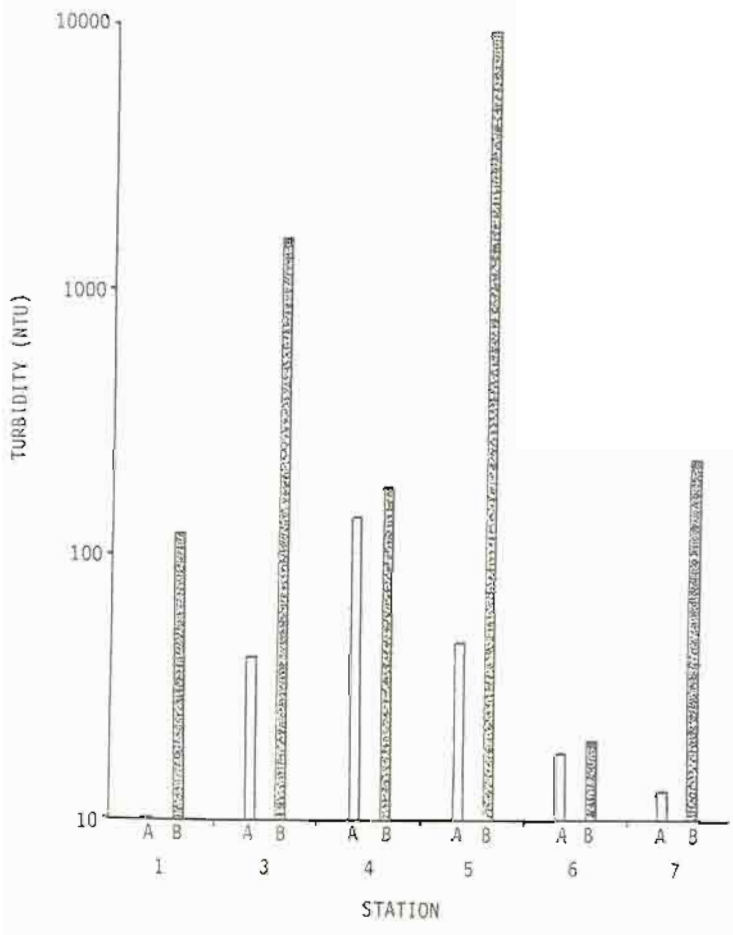

Fig. 2. Turbidity samples collected on Mar. 17. "A" is above Rd. 450, "B" is below. Sta. 6 is the control. Note LOG scale for turbidities.

Impacts from these disturbances in the South Fork of Hare Creek were great enough to elevate turbidity, and hence suspended sediment concentrations, in the much larger main fork of Hare Creek. The average turbidity for Hare Creek above the South Fork for five storm flows in March was 39 NTU, while below it the value was 58 NTU. This represents a 49 percent increase in turbidity and an estimated 47 percent increase in suspended sediment concentration. Since no other sediment sources could be identified in the South Fork drainage, it is very likely that most of the sediment came from the road system.

This study has produced data similar to that which has been collected previously in Washington. By limiting hauling during and for a short time following rainfall, damage to water quality can be substantially reduced. To preclude problems of this nature on JDSF in the future, hauling will not be allowed during rainy conditions and more emphasis will be placed in getting an appropriate depth and quality of rock on road surfaces.

Acknowledgments: The USFS's Redwood Sciences Laboratory in Arcata analyzed the water samples for suspended sediment concentrations.

Literature Cited:

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OPPORTUNITY OF A LIFETIME

Imagine you were offered an opportunity to work in a distant land for one year and could then return to your present position. The job would be similar to your own, yet provide a breadth of new dimensions you would never experience in your homeland. The language barrier would be minimal and the culture interestingly different, but with similarities to your own. Your employer would pay all your expenses and you could take your family along (paying their fare).

Sound interesting? Two fortunate individuals and their families are soon to experience these new life styles. The position exchange between the California Department of Forestry & Fire Protection (CDF) and Department of Conservation Forest and Lands (CFL) in the State of Victoria, Australia, is scheduled to begin about November 1. Malcolm Tonkin (CFL) from Benalla, Australia, will be switching jobs with myself, Walt Decker, at JDSF.

Pete Cafferata, editor of the JDSF Newsletter, has asked that I write home occasionally to share this unique experience with you. In the coming year "Letters from Down Under" will attempt to provide a brief glimpse into our new life from a human interest as well as a professional perspective. Pay close attention, you may want to look into a future position exchange yourself.

Mr. Tonkin proposed the exchange by letter to the CDF Director. In part he stated: "I am seeking an opportunity to exchange my position here in Benalla with that of a forester in the USA for a period of 12 to 24 months. I believe such work exchanges would be of mutual benefit to both individuals and their respective employers." In August 1988 I responded to Deputy Director Delfino's memo soliciting applicants. My thoughts were, "It's a long shot but why not give it a try." Now, only 14 months later, we are nearing departure time.

Next, may I introduce you to my family, through whose daily experiences I expect to relay to you many of our impressions of Australia and the exchange. My wife, Gail, and I have been looking into similarities and differences in the life down under. Since the seasons are reversed in the Southern Hemisphere, we will leave California on a Sunday evening this fall, cross the international dateline during our 20-hour flight, and land in Melbourne on what we hope will be a fine spring morning the following Tuesday. As we recover from jet lag, season advance, and Gail's 14-month anxiety over "How soon do we leave?", we may begin noticing the similarities to home. The State of Victoria is located at approximately the same latitude south of the Equator as California is above. The Mediterranean climate has similar mild winters and hot,dry summers.

Shellie, our 17-year-old, began her junior year this fall in an intensified course (4 hours per day) in American history. She expects to complete this part of her required U. S. curriculum before our departure. It seems those Aussies do not offer American history. Shellie is also somewhat apprehensive concerning the uniform for public school students down under. Laura is 7, has just lost her two front teeth, and wants to know why her puppy, Roscoe, can't go along. Actually we are exchanging more than just jobs. We will be living in the Tonkins' house, driving their car (on the left side of the road) and Laura will have their cat to feed and care for in place of her puppy. Of course, the Tonkins' will be living our lives just as fully.

Ken Delfino, CDF Deputy Director for Resource Management, expects to show Mr. Tonkin the full extent of our CDF mission throughout California. You may, therefore, have an opportunity to meet with him, enjoy his accent, and learn more about Australia. Be a gracious host, and look for "Letters from Down Under" in the following year.

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